National Bridge Inspection Standards &
Bridge Maintenance Program Review
Lake County
July 14, 2021

(October 21 data update)

By: Mark Sherman, PE
CEAO Federal Bridge QA/QC Engineer

IN ATTENDANCE:

Gabe Liptak, Lake County
Mark Sherman, CEAO Federal Bridge QA/QC Engineer
Alan Exley, Lake Co
Erin Fink, Lake Co

SCOPE OF REVIEW:

The review consisted of interviews with Lake County personnel, reviews of inspection and inventory data, and reviews of Lake County bridge records. The office evaluation assessed Lake County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of **6** bridges were conducted to determine if ratings were consistent with the ODOT Coding Manual and FHWA Recording and Coding Guide and to determine if inventory items were coded correctly. The bridges were selected by Hardin County to represent a variety of structure types and conditions. The bridges checked during the field review were:

Asset Name	Bridge Type	County Rating	NBIS Rating
LAK-00221-02.15_(4336836)	Steel Pony Truss	6	Agreed
LAK-00609-00.24 _(4333098)	Steel Beam	3	Agreed
LAK-00417-03.63 _(4330625)	Timber Culvert	5	Agreed
LAK-00537-01.20_(4342879)	Concrete Cont. Slab	5	Agreed
LAK-SANC-00.48_(4333802)	Prestressed Box Beams	3	Agreed
LAK-00601-00.90_(4333691)	Prestressed Box Beams	5	Agreed

FINDINGS AND COMMENTS:

General:

Ohio State statutes establish requirements governing the safety inspection of all bridges within the State borders. ODOT with participation of FHWA has developed the ODOT publication Bridge Inspection Manual, hereafter referred to as the Manual, which establishes guidance and requirements regarding bridge inspections within the State. FHWA has determined that ODOT guidance meets or exceeds the FHWA NBIS requirements.

The federal regulations for administering the NBIS are located in the Code of Federal Regulations 23 Highways – Part 650 Subpart C - National Bridge Inspection Standards. The

regulations can be found at the following web site:

http://wwwcf.fhwa.dot.gov/legsregs/directives/fapg/cfr0650c.htm
Ohio currently rates bridge element conditions with a 1-4 scale. Summary items conform to the definitions and rating scales established by the NBIS. The NBIS do not require element level condition rating for County bridges unless they are on the expanded National Highway System (NHS) beginning October 1, 2014.

Lake County has inspection responsibilities for **101** bridges, **66** of which are longer than 20 feet in length and **35** which are 10 feet to 20 feet long. The NBIS inspection and load rating requirements only pertain to highway bridges in excess of 20' long on public roads. Review of the inventory span lengths showed that all bridges had the NBIS designation Y/N coded correctly.
The office review and the field review demonstrated that County personnel were inspecting and coding bridges in accordance with ODOT's Bridge Inspection Manual ("Manual").

Inspection Procedures:
Lake County uses their own staff to do the inspections. Previous inspection reports are available at site for review. The previous year's inspection reports are on paper and transferred to AssetWise in the office. Bridge comments are recorded in the inspection form.
Bridge plans are available in the office. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection and posted in Assetwise.
The County has **0** bridges that require a snooper.
A Team Leader is present at routine inspections.

Frequency of Inspections (metric 6 & 7)
Ohio State Transportation Laws require all State and local bridges to be inspected annually.
Lake County had **105** bridges inspected in 2020. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. The Engineer determines the need for a routine inspection frequency greater than once a year, based on inspections and history.
There are no bridges that require inspection more frequently than one year.
Lake County had **0** bridges overdue for Fracture Critical inspection at the time of this field review.

Qualification and Duties of Personnel (metric 1 & 2)
Program Manager:
Name: Gabriel J. Liptak, PE Lake County Bridge Engineer
List qualifications/yrs. Experience.
Inspection related experience: 3 years
List courses attended (& approx dates).
Bridge Inspection Part 1 – June 9-11, 2014
Bridge Inspection Part 2 – July 15-17, 2014
Permit Required Confined Space Training – October 22, 2014

Ohio DOT Bridge Inspection Refresher Training (Online) – December 10-11, 2020

Reviewer:

Name: Alan L. Exley, PE, PS and an ODOT Pre-Qualified Consultant

List qualifications/yrs. Experience:

25 years inspecting county system bridges

List courses attended (& approx. dates):

Ohio Comprehensive Bridge Inspection School – June 1996 LTAP

ODOT Culvert Inventory and Inspection – September 1, 2010 LTAP

ODOT MBI Update – March 30, 2011 LTAP

ODOT SMS Training – May 14, 2013 LTAP

ODOT MBI Refresher – May 10, 2017 Ohio DOT Bridge Inspection Refresher Training (Online) – January 29, 2021

Team Leader:

Name: Erin M. Fink, PE

List qualifications/yrs. experience (bridge inspection experience)

11 years inspecting county bridges

List courses attended (& approx. dates):

Bridge Inspection Part 1 – May 17-19, 2011

Bridge Inspection Part 2 – June 14-16, 2011

LTAP ODOT SMS Training – May 14, 2013

LTAP ODOT MBI Refresher – May 10, 2017

Load rating Engineer:

Gabriel J. Liptak, PE Ohio PE # 83390

Underwater Bridge inspector: NA

Inspection Reports (metric 12)

As part of this review, eight bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all of the field sampled bridges properly reflected the field conditions within the tolerance of 1 rating value when compared to the Manual.

Summary ratings correspond with the NBIS inspection items.

Field Review:

LAK-00221-02.15_(4336836) Steel Pony Truss

Item 58 Deck…… **5** Ok (could easily be a 4 given areas of pan bottom have rusted through.)

Item 59 Superstructure……**6** Agreed

Item 60 Substructure……**6** Agreed

Item 61 Channel……**8** Agreed

Item 61.01 Scour……**7** Agreed

Item 62 Culvert……N

Item 36 Railing…….. 0 0 0 0 (not up to current Standards)

Item 72 Approach Alignment …….. **6** (Severe 90deg curve at end of bridge and GR damage would indicate a **4** or less.)
Comments: Excellent Comments
Defect Photos: Very good defect photos
Channel Photos: Great Channel photos

LAK-00417-03.63 _(4330625) Timber Culvert
Item 58 Deck…….. N
Item 59 Superstructure……N
Item 60 Substructure…….N
Item 61 Channel……..**5** Agreed
Item 61.01 Scour……..**7** Agreed
Item 62 Culvert……..**5** Agreed
Item 36 Railing…….. 0 0 0 0
Item 72 Approach Alignment …….. 8 Agreed
Comments: Good Comments, but need a little more L.E.S. in the description.
Defect Photos: Need more detailed photos showing member separations and other defects.
Channel Photos: Great Channel Photos

LAK-00537-01.20_(4342879) Concrete continuous slab
Item 58 Deck…….. **5** Agreed (Spalled areas are not large. Relative area calculations may indicate a 6, but it is within the 1 pt. rule)
Item 59 Superstructure……**5** Agreed
Item 60 Substructure…….**7** Agreed
Item 61 Channel……..**5** Agreed
Item 61.01 Scour……..**7** Agreed
Item 62 Culvert……..N
Item 36 Railing…….. 0 0 0 0
Item 72 Approach Alignment …….. 9 Agreed
Comments: Excellent Comments!
Defect Photos: Could use a few more Defect Photos to support rating numbers.
Channel Photos: Channel photos are adequate, but would be much better if taken when vegetation is not obscuring the view.

LAK-SANC-00.48_(4333802) Prestressed Box Beams
Item 58 Deck…….. **5** Agreed
Item 59 Superstructure……**3** Agreed
Item 60 Substructure…….**6** Agreed
Item 61 Channel……..**5** Agreed
Item 61.01 Scour……..**6** Agreed
Item 62 Culvert……..N
Item 36 Railing…….. 0 0 0 0
Item 72 Approach Alignment …….. **7** Agreed
Comments: Excellent Comments
Defect Photos: Excellent defect photos
Channel Photos: Good channel photos as well

LAK-00609-00.24 _(4333098) Steel Beams
Item 58 Deck……..**5** Agreed
Item 59 Superstructure……**3** Agreed

Item 60 Substructure…….**6** Agreed
Item 61 Channel……..**5** Agreed
Item 61.01 Scour…….**6**
Item 62 Culvert……..N Agreed
Item 36 Railing…… 0 0 0 0
Item 72 Approach Alignment …….. 8 Agreed
Comments: Great Comments
Defect Photos: Good defect photos
Channel Photos: One good channel photo from one side, need one from the other side.

LAK-00601-00.90_(4333691) Prestressed Box Beams

Item 58 Deck…….. **5** Agreed
Item 59 Superstructure……**5** Agreed
Item 60 Substructure…….**5** Agreed
Item 61 Channel……..**7** Agreed
Item 61.01 Scour……..**7** Agreed
Item 62 Culvert……..N Agreed
Railing…….. 0 0 0 0
Item 72 Approach Alignment …….. 8 Agreed
Comments: Great Comments
Defect Photos: Great Defect Photos in files, need some in Assetwise.
Channel Photos: Great channel photos

Inventory Items

Review of the bridge data showed **2** out of **68** bridges were missing comments when the rating was <=5. The review of the **6** bridges in the field showed **consistently excellent comments. Very good defect photos and Channel photos.** This requirement became effective Nov of 2020.

Bridge Files: (metric 15)

Lake County keeps files listed below as follows:

☐ Inspection reports, including old inspections	GIS & Paper File
☐ Design Calculations	Paper File
☐ Plans	GIS & Flat File Originals
☐ Load analysis calculations	GIS & Paper File
☐ Inventory forms	GIS
☐ Photos and sketches	GIS
☐ Repairs and maintenance history	Paper File
☐ Scour evaluation	GIS & Paper File
☐ Scour POA	N/A
☐ Fracture Critical File	GIS & Paper File
☐ Load Posting/Closing	GIS & Paper File
☐ Underwater inspections	GIS & Paper File
☐ Special inspection eqpt. or procedures	GIS & Paper File
☐ Flood data, waterway adequacy, channel cross sections	GIS & Paper File

Load Rating (metric 13)

The inventory shows 68 (100.00%) of the County NBIS bridges have been Load Rated or

Load Rating was not applicable. There are 0 NBIS bridges evaluated by documented engineering judgement using the BR100 form.
Load Ratings were checked for **SFNs 4336933; 4348923; 4352445.** The load posting at the bridge matched the load rating on all bridges. P.E. name and stamp were on all of the bridges. Documentation was on all of the bridges. BR100 form is available for all engineering judgment bridges.
Two NBIS bridges have not load rated. **SFN 4330072 & SFN 4333136** because they are not ratable due to lack of rebar information in the former and the latter is an elliptical pipe.

Load Posting (metric 14)
Lake County has **5** NBIS bridges that are load posted. There is **1** bridge closed for condition ratings**. (SFN# 4336437**)
Posting is based on Operating Rating Gross Tonnage signs are the type of sign used for load posting.

Special Features
There are 0 bridges with unique or special features.

Fracture Critical Bridges (metric 16)
The FC bridge inspection frequency is 12 months, done with routine annual inspections.
FC plans for **SFN 200292; 4336836** were reviewed and the FCM's identified.
Gusset Plate calculations were satisfactory for both **SFNs 200292; 4336836**

Underwater Inspections and Scour (metric 9 & 17)
Lake County has **3** bridges requiring underwater inspection. SFNs 4336178; 4345746; 4345681
SFN 4345746 was reviewed for underwater inspection and had a written procedure; location of UW elements identified and the frequency stated.

QA/QC
The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. The Inventory items are checked and updated during annual inspections.

Critical Findings (metric 21)
The county currently does have one critical finding. **(SFN 4336437**) the critical finding has been resolved and the bridge is closed pending repair or replacement. The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). The county bridge engineer is the bridge inspector and develops the plans for emergency work.

Bridge Maintenance (From Questionnaire)
The County does contract bridge work. The typical work is for large bridges, replacements and repairs. Fed Funds are sometimes used for bridge deck replacement and Credit Bridge Funds are used for bridge replacements. The annual budget varies from year to year but averages **$1,000,000.00** for Contract work.

The county does force account bridge work and uses highway maintenance crews as needed.

Typical work items include all repairs and medium replacements. The annual budget for force account work is approximately **$100,000.00**.

The chart below is a review of the 23 Metrics used to measure NBIS compliance and the chart represent a preliminary, tentative assessment of the county's level of compliance. Action steps for compliance are listed at the bottom. The actual assessments of NBIS compliance are made by FHWA, based on documentation, and any final determinations of compliance may differ from this preliminary assessment. The Metric 12 & 22 result on the following page is based on the field review of the six bridges visited during the QAR using the NBIP Field Review Checklist - PY 2013, Minimum Level Review Items.

PRELIMINARY FHWA 23 Metric Matrix
23 metrics used by FHWA to measure NBIS compliance. Actual "score" by FHWA may differ.

Compliance Codes for the following Metrics:
(C) Compliant
(SC) Substantially Compliant
(CC) Conditionally Compliant
(NC) Not Compliant

Metric	Description	(C)	(SC)	(CC)	(NC)
1	State Bridge Inspection Organization				
2	Program Manager Qualification				
3	Team Leader Qualification				
4	Load Rating Engineer Qualification				
5	UW Bridge Inspection Diver Qualification				
6	Routine Inspection Frequency - Low Risk				
7	Routine Inspection Frequency - High Risk				
8	UW Inspection Frequency - Low Risk				
9	UW Inspection Frequency - High Risk				
10	FC Inspection Frequency				
11	Frequency Criteria				
12	Inspection Quality				
13	Load Rating				
14	Posted or Restricted Bridges				
15	Bridge Files				
16	FC Bridges				
17	UW inspection procedures				
18	Scour Critical Bridges				
19	Complex Bridges				
20	QC/QA				
21	Critical Findings				
22	Inventory **				
23	Updating of Data				

** based on results of Field Review